# BUSINESS ANALYSIS

## with Microsoft® Excel

# Business Analysis with Microsoft Excel

*Conrad G. Carlberg*

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# About the Author

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# Dedication

*For Toni, Sammy, and Eddie.*

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# Working with Income Statements

In many ways, operating a business is like playing a game—a serious one, of course—and keeping track of your business is similar to studying games such as baseball. Serious baseball fans know hundreds of statistics, such as batting averages and strikeouts. Similarly, if you are serious about your business, you need to be able to measure and understand the numbers that describe how your company operates. Accounting in general and financial statements in particular provide the scorecards.

This chapter is no treatise on accounting and finance, but it does describe tools that you can use to better understand the financial aspects of operating your business. Plenty of textbooks cover the generally accepted procedures of accounting and finance. This chapter highlights and demonstrates some practical techniques used in those procedures.

## Keeping Score

Accounting translates the actions that take place in the business world into a set of numbers that you can use to make informed decisions. Accounting captures information on how well a company operates, the many obstacles that it needs to overcome, and its prospects for the future.

Accounting rules enable you to compare your company with other companies and other industries and to make year-to-year comparisons for your own company. For example, it's against the rules to change your method of depreciation without full disclosure of the effects of the change on the company's financial statements. Depreciation amounts affect a company's reported profit; if you could change your depreciation method whenever you felt like it, you could change your reported

profit when it was expedient to do so. Then it would be impossible for those who might invest in your business or who might loan it money to have confidence in the validity of your financials. Having rules and following them makes it possible to conduct business. As we saw during the early 2000s, failing to follow the rules helped to trigger the Great Recession.

It's important to be able to make comparisons with other companies when you want to seek additional funds for expansion, such as by borrowing or by inviting capital investment. Following the rules can open opportunities to succeed and to receive equal treatment in a rugged marketplace. But you don't need to be a CPA to use accounting for solid decision making. It can be as simple as subtracting your expenses from your revenues to determine your profits.

Accounting quantifies the everyday world of buying and selling. Would you buy something for more than you could sell it? Of course not—but many companies do exactly that every year. The collapse of an energy trading giant, of many of the dot-com startups, and of the telecommunications and investment banking conglomerates can be traced to that very mistake. Too often, businesses look at only the up-front costs and ignore the ongoing operation and maintenance costs. It's trite to say so, but things get trite by being true: The devil is in the details, but finance and accounting can help you maintain control.

## Choosing the Right Perspective

We all tend to think of accounting as an exact science that is fully governed by rational rules, but the numbers generated are actually only best estimates. Although the rules, procedures, and methods make the numbers appear to be objective facts, they are far from absolute.

The numbers represent how well the managers are running the business. Balance sheets and income statements are not commandments; they are guides, and different users have different purposes for them.

## Defining Two Purposes for Accounting

This book (along with just about any book that discusses it at all) classifies accounting according to who's using the information:

- Management accounting provides information to decision makers inside the company. If you want to bring a new product to market, you assess the product's potential by analyzing cost, price, market demand, and competition. You make judgments about the product—whether to introduce it, how to manage it, whether it has run its course—on the basis of the financial and operational data you have available.

- Financial accounting provides financial information to the company's decision makers, as well as to those outside the company, such as investors, creditors, and governments. Suppose that you wanted to raise funds by making your company a public corporation and issuing shares of stock to the investment community. Potential investors would require detailed financial accounting information (and the law would require you to make it available). An investor wants to know that a set of accepted standards was used

to create the information. Otherwise, there is no way for that investor to make an informed choice.

When you decide whether to introduce a new product or make any other management decision, you use a more flexible analytic framework than when you are trying to raise capital in the investment community. You often need room to maneuver, and management accounting provides you with that room.

For example, you might want to use the last-in, first-out (LIFO) method of valuing inventory if your objective is to set sales policies. The LIFO method is the best way to measure net income, taking current prices and costs into account. But the FIFO (first-in, first-out) method provides a better estimate of assets on the balance sheet. So, management accounting allows you the flexibility of choosing your method of valuation, depending on the purpose you have in mind.

➜ For more information about valuing inventory, **see** Chapter 3, "Valuing Inventories for the Balance Sheet."

Both aspects of accounting are necessary tools, and this book discusses financial accounting from time to time. However, the principal focus is on making information as useful as possible for internal decision making: that is, management accounting.

To use accounting information for routine decision making, you don't need to explore in depth the nuances and technicalities of the accounting profession. But if you understand this information well enough to use it on a routine basis, you will be much better prepared to use your accountant's time wisely when a delicate decision is required.

# Using the Income Statement

The income statement is a powerful tool for decision making. It portrays the flow of money and the relationship of revenues to expenses over a period of time. It tells us how much money was made in an accounting period such as a year. The terms *profit*, *net income*, and *earnings* are commonly, interchangeably, and somewhat loosely used to state the bottom line.

The income statement provides a starting point in the analysis of a business. The popular press frequently reports earnings and nothing more: "Today U.S. Widgets reported quarterly income of $240 million." This is positive (unless the marketplace expected it to report $480 million), but there is more to the story.

## Choosing a Reporting Method

The measurement of net income is an attempt to match the value generated by a business (its revenues) with the resources it consumes (its expenses). The sentence "In fiscal year 2017, we sold $200 million of product and services, at a cost of $175 million, for a profit of $25 million," quantifies the operation of the business over a one-year period. The business now has a track record, a place to begin the analysis of its operations.

However, you need more detail than what's required to measure and report income in a generally accepted fashion. Accountants use a series of conventions that strengthen the validity of the income statement. If you read an income statement that you believe to have been prepared using these conventions, you generally have greater faith that the information is valid and credible. Perhaps the company is worth investing in or lending money to.

There is no one way to structure an income statement. Your choice depends on how you intend to use the statement and what picture you want to present. The key is that the information be useful in support of decision making. Your audience could be potential investors, creditors, or internal (sometimes external) managers.

Figures 1.1 to 1.4 show some examples of commonly used income statement formats.

**Figure 1.1**
An income statement format suitable for external reporting usually omits details such as inventory levels but includes all categories that affect net income.



| | A | B | C | D |
|---|---|---|---|---|
| 1 | FiberOps, Inc. | | | |
| 2 | Income Statement | | | |
| 3 | For the year ended December 31, 2018 | | | |
| 4 | | ($000) | | |
| 5 | | | | |
| 6 | Net Sales | $ 97 | | |
| 7 | Cost of Goods Sold | $ 42 | | |
| 8 | Gross Margin | $ 55 | | |
| 9 | Selling, General, and Administrative Expenses | $ 33 | | |
| 10 | Operating Profit (Earnings Before Interest and Taxes) | $ 22 | | |
| 11 | | | | |
| 12 | Nonoperating Income (Expenses) | | | |
| 13 | Interest | $ 5 | | |
| 14 | Other | $ (1) | | |
| 15 | Income Before Taxes | $ 26 | | |
| 16 | Provision for Taxes | $ 5 | | |
| 17 | Net Income | $ 22 | | |
| 18 | Preferred Dividends | $ 5 | | |
| 19 | Net Income Available for Common Shareholders | $ 16 | | |
| 20 | | | | |

FiberOps Income Statement

Ready      100%

## CASE STUDY: DOCUMENTATION FOR A BANK LOAN

Your company wants to take out a bank loan for the purchase of new factory equipment. As the company's chief operating officer, you oversee the day-to-day activities. You also stay focused on topics such as the amount of your costs relative to your revenue, and what your profit margins are on a product-by-product basis.

When it evaluates your company's loan application, the bank has only a secondary interest in those matters. Issues such as variable costs and product line profit margin are important, of course, but those are management issues. Items that matter to a lender bear directly on the company's ability to service a loan: its sales volume, gross profit and operating profit. You could use a format such as the one shown in Figure 1.1 for the income statement that accompanies your loan application.

Figure 1.1 shows a typical layout of an income statement used for external reporting purposes. Notice that there are apparent math errors in the report, in rows 17 and 19. These can appear when a currency format obscures significant digits. When, for purposes of space and simplicity, you divide actual figures by, say, 1,000 and indicate by a column header that the entries are in $1,000s, *consider* using Excel's ROUND() function. For example:

```
=ROUND(4690/1000,0)
```

Had this been used in cell B16 of Figure 1.1 instead of the actual entry of 4.69 (which the cell format displays as $5), the result of the calculation in cell B17 would have been shown as $21 instead of $22.

I put the word "consider" in italic just now because the ROUND function can create as many problems as it solves. To continue this example, if you used ROUND in cell B16 of Figure 1.1, cell B17 would indeed show $21 instead of $22. But then cell B19 would show $16 when its true value is $15. In general, you must choose between two alternatives in this sort of situation:

- Bite the bullet and choose to show exact figures instead of rounded or truncated values. The downside is that your financials can appear cluttered and more difficult to comprehend.
- Use the ROUND function (or one of its close cousins, ROUNDUP and ROUNDDOWN) to get an integer or to otherwise limit the number of decimals in a value. Include a note that totals may appear inaccurate due to rounding. The downside is that in the course of solving one apparent math error, you might induce another.

> **CAUTION**
>
> You can also choose to set the precision of calculation to the precision used in the display, but that's a risky procedure. Doing so permanently changes a value stored as 4.69 to its displayed appearance, which might be 5. This is seldom a good idea. However, if you must do so, you can click the File tab, select Options, and then click Advanced. Scroll down to the When Calculating This Workbook section and select the Set Precision As Displayed check box. To locate that check box in versions of Excel prior to Office 2007, choose Tools, Options, and click the Calculation tab.

Just as there are many uses for income statements, there are many ways to structure income statements. The same firm might modify and adjust its report of income and costs based on the purpose it has in mind; as a result, the income statements need to reflect different sets of requirements.

## Cells in Excel

If you're new to Excel, you might find the preceding discussion obscure—maybe even point-less. There is something about Excel (actually, about any worksheet application) that is absolutely fundamental but often goes unsaid: What is in a cell isn't necessarily what the cell displays. Furthermore, a cell can contain either a value or a formula that results in a value.

Suppose that you open a new workbook, select cell A1 on Sheet1, type the number 2.51, and press Enter. You see 2.51 in the cell, and you also see 2.51 in the Formula box. (That's the box just above the column headers and just to the right of the $f_x$ symbol.) In this case, what you see in the cell is what the cell contains.

Now click the Home tab on the Ribbon, and click twice the Decrease Decimal button in the Number group. You now see the number 3 in cell A1, but you still see 2.51 in the Formula box. The reason is that when you click the Decrease Decimal button, you alter the cell's appearance—its number format, in this example—but not the value stored in the cell. And when you decrease the number of visible decimals to zero, Excel responds by rounding the display to the nearest integer.

> **NOTE**   If you're wondering why you get a 3 instead of a 2 when you decrease the decimals displayed for the value 2.51, you're thinking along the right lines. Microsoft could have chosen either to round the display of 2.51 to 3 or to truncate the display from 2.51 to 2. But rounding is less wrong than truncation, twice as often.

If you now use cell A1 as part of a formula in another cell, that formula uses the value in A1 regardless of the number format you've chosen to use for A1. For example, suppose you enter this formula:

```
=5 – A1
```

in cell A2. That formula would result in the value 2.49 (that is, 5 – 2.51). It would not result in the value 2, as it would if it subtracted 3 from 5. Changing a cell's number format alters its apparent value but not its actual value. In short, what you see isn't necessarily what you get.

Now suppose that instead of entering 2.51 in cell A1, you started by entering this formula in A1:

```
=3 – .49
```

You still see 2.51 in the cell, but now the Formula box shows the formula. You can take this as one of the rare instances of "always" in Excel: The Formula box always shows a visible cell's contents. The cell usually shows the value, whether the cell contains an actual value or a formula. (The exception is when you set an Excel option to show formulas, not their results, in cells.)

With the formula instead of the value in the cell, you can still use the Decrease Decimal button to cause the cell to show 3 instead of 2.51. So, in a case like this, you might not see the cell's actual value anywhere; the Formula box shows the formula, and the cell shows the formula's result as modified by the number format.

As I wrote at the outset of this section, if you're new to Excel, these distinctions might seem obscure and pointless. But dealing with them quickly becomes second nature. That said, we can return to the issue of the design of income statements in Excel.

## CASE STUDY: INVENTORY CONTROL IN A MERCHANDISING FIRM

You are in charge of purchasing products for resale by a retail store. To hold down inventory carrying costs and avoid the use of cash until absolutely necessary, you have instituted Just in Time inventory procedures. If these procedures are working as you designed, your inventory levels at the end of the year should be about the same as—or, ideally, lower than—the levels at the start of the year and should align with the turnover of the products your business sells. For your management purposes, you might arrange to obtain an income statement like the one shown in Figure 1.2.

**Figure 1.2**
An income statement format suitable for certain management purposes in a merchandising firm might exclude dividend information but provide details on inventory levels.

| | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | Davis Office Furniture | | | | |
| 2 | Income Statement | | | | |
| 3 | For the year ended December 31, 2018 | | | | |
| 4 | | | | | |
| 5 | | ($000) | ($000) | | |
| 6 | | | | | |
| 7 | Sales | | $ 332 | | |
| 8 | Less Cost of Goods Sold | | | | |
| 9 | Opening Inventory | $ 43 | | | |
| 10 | Add Purchases | $ 52 | | | |
| 11 | Goods Available for Sale | $ 95 | | | |
| 12 | Ending Inventory | $ 27 | | | |
| 13 | Cost of Goods Sold | $ 68 | | | |
| 14 | | | | | |
| 15 | Gross Margin | | $ 264 | | |
| 16 | | | | | |
| 17 | Less Operating Expenses | | | | |
| 18 | Administrative Expenses | $ 82 | | | |
| 19 | Selling Expenses | $ 51 | | | |
| 20 | Operating Expenses | | $ 133 | | |
| 21 | | | | | |
| 22 | Operating Income | | $ 131 | | |
| 23 | | | | | |

A manufacturing firm might use a different format for an income statement (see Figure 1.3).

**Figure 1.3**
An income statement for a manufacturing firm, formatted for planning purposes, often includes detailed information about the cost of goods manufactured in a supplement.



The major difference between the structure of the manufacturing firm's income statement and that of the merchandising firm is in the cost of goods sold. For the manufacturer, the cost of goods manufactured is added to the opening inventory. For the merchandiser, purchases from suppliers are added to the opening inventory. The manufacturer is likely to have various cost subcategories within the cost of goods manufactured, such as raw materials, factory overhead, and labor costs; these are often detailed in a supplement to the income statement. These subcategories do not appear in the merchandiser's income statement; the cost of purchases is seldom broken down further—although it certainly could be, to help product management meet its goals.

For example, one special type of income statement supports the management of the business from the perspective of specific products and expenses. The amount of detail in the income statement should be tailored to the manager's data requirements. Figure 1.4 shows an example.

This income statement excludes items such as interest and amortization, and a manager can use it to analyze everyday operations. It provides a more targeted view of revenue and expense and is an example of the type of income statement a manager needs to guide a department.

Ideally, you should tailor the income statement to a format that you and your managers can use routinely. You can expand the level of detail shown in Figures 1.1 to 1.4 to include the data that you need most often. Here, both judgment and creativity become critical. A simple reformat of data or an added detail line item can enrich your insight into the way your business operates.

**Figure 1.4**
An income statement format that is used for the management of revenues and expenses shows how funds were acquired and spent.



For example, you could drive the behavior of your management team by means of a link between your bonus systems and a customized income statement. Suppose that you want to get your sales force to concentrate on developing new accounts. Your income statement might show revenue figures for sales both to existing accounts and to new business, and it might include cost figures for bonuses paid for new business. This could help prod the sales force to concentrate on the more difficult process of new business sales.

As Figures 1.1 to 1.4 imply, there are many possible ways to structure an income statement. Each one reflects a different set of circumstances, defined by the business's specific situation. There are guidelines, but there is also flexibility within those guidelines to tailor a statement to your needs. Your business and the way you want to use the data set the direction for the type of income statement to use.

## Measuring the Operating and Nonoperating Segments

An income statement records the flow of resources over time. Operating income measures the extent to which revenues generated during the accounting period exceeded the expenses incurred in producing the revenues. This measure tells whether the firm's core operating business made money.

> **NOTE**
> It's useful to distinguish operating income, the difference between revenues and expenses, from net income, which takes the additional effect of taxes, interest, and other charges into account.

Income statements commonly divide this resource flow into operating and nonoperating segments. The operating segment represents what occurred on a day-to-day basis to generate income. The nonoperating segment represents the assets that the firm might have financed, the tax impacts of being in business, and extraordinary occurrences such as the one-time sale of a major company asset.

When you analyze a business, it is important to keep the two segments separate. If you were considering the expansion of your own business, you might first ask yourself whether the firm made money and whether you can fund an expansion with the profits. Your focus would be on the numbers produced by your normal, everyday business operations; you would not want to base your decision on the effect of a one-time, unique event. You would take that event into consideration, but you would not rely on its effect in your forecast of future earnings.

An income statement's operating segment represents the results of the company's major, ongoing activities, and the nonoperating segment represents all the company's secondary or ancillary activities. The company needs to understand both segments to grasp the total picture and know how best to prepare for its future.

## Moving from the General Journal to the Income Statement

In the past, it's been typical for a business to record its daily transactions in a general journal. This record keeps track of every individual transaction in every account, such as cash investments, cash paid, accounts receivable, accounts payable, and so on.

In more recent years, the availability of relatively inexpensive accounting software has changed all that. As recently as the 1990s, for example, an accounting package for a small business could easily cost $10,000 and provide much more functionality than was needed. In 2018, a business can buy adequate accounting software for a few hundred dollars or less.

One result is that we're now entering information about product sold, sales price, sales tax, customer name, income account, and asset account into a specially designed window instead of in a ruled journal. The days of green eyeshades and sleeve garters are gone for good. (Nevertheless, and although it's usually hidden from view, all that sales and expense information is still going into a general journal that your accounting software maintains.)

Your business might involve a few high-value transactions during an accounting period, and if so you might prefer to forego the benefits of specialized accounting software. Even if the direct cost of the software is trivial, there's still a learning curve. In that case, you might want to exercise the greater control that's available to you in a generalized worksheet environment such as Excel's. And then you'll want to know more about journals, information of the sort discussed here.

Or, if you have decided to invest in accounting software—and that's your likelier choice—it will be easier for you to understand what's going on inside the black box if you have a glance at the remaining material in this chapter and in Chapter 2, "Balance Sheet: Current Assets."

## Getting the General Journal into Excel

Many different software programs are available to help you record and store information about your business transactions. Some programs provide the user with conveniences such as a predefined chart of accounts and automatic linkages between journals, ledgers, and other reports. Therefore, many people prefer to use software other than Excel to gather information on individual transactions. (A chart of accounts is simply a list that associates account names and purposes with numbers that identify the account. For example, you might decide to identify the liability account named Accounts Payable with the number 20000.) For a *very* small business, Excel is a sensible choice of platform for entering, storing, and retrieving information about individual transactions. (Normally, for these purposes, Excel is less powerful and flexible than a true database such as Oracle or, on a smaller scale, Microsoft Access. But the differences in power and flexibility are virtually meaningless when a relatively small amount of data is involved.)

But keep in mind that Excel is not designed as a specialized, full-featured accounting package. If you choose Excel to handle your accounting, you have to build many features from scratch, including your own categories for transactions, the double entry of individual transactions, and so on. Excel is much better suited to summarizing and analyzing the transaction data that you get from some other source—often, single-purpose accounting software.

After you have imported the data into Excel, you can manipulate it to meet your requirements, including anything from category subtotals to statistical analysis. Few accounting packages directly support the detailed financial analysis of accounting data, but most provide an export feature that creates data files that Excel can open.

On the other hand, if you enter and store individual transactions using software other than Excel, you might occasionally have difficulty importing files into Excel. Although most such programs have an option that enables you to export data in ASCII (text) format, the arrangement of the exported data might not be ideal for import into Excel. Other accounting packages can export directly into Excel, but then the worksheet that the accounting package creates might have features that you could do without.

For example, some programs export each part of a record onto a different line of the ASCII file: one line for the account number, another line for the account name, another line for the transaction amount, and so on. However, most of Excel's data and charting tools work best with data laid out as a list (or, since Excel 2007, as a table): different records in different rows and different fields in different columns. To take advantage of this layout, you would need to do some preliminary work with the accounting package's export file.

> **NOTE** Attractive alternatives include the use of Structured Query Language (SQL) tools, ActiveX Data Objects (ADO), and Data Access Objects. If the accounting software that handles your transactions conforms to certain standards, you can arrange to import the data into Excel in a form that is ready for use in reports such as income statements and balance sheets.

Certainly, you can import ASCII files into an Excel worksheet quite easily by clicking the File tab, clicking Open, and then choosing Text Files from the drop-down to the right of the File edit box (prior to 2007, start by choosing File, Open).

However, after you have imported the information, you might find it necessary to move the account name and the transaction amount onto the same line as the account number. If you have many records to import, this cutting and pasting can become tedious, and you should consider recording and then running an Excel macro to do the rearrangement for you.

> **NOTE**
>
> In Excel, a *macro* is a collection of statements written in a version of the BASIC programming language. Excel is capable of recording statements that mimic exactly what you do in the Excel graphical user interface. When you're ready to perform a sequence of actions in an Excel worksheet, turn on the macro recorder. (There's a Macro Recorder button on Excel's Status bar, near its left edge.) Perform your actions, and then click the Macro Recorder button again to turn it off. You can now play the macro back from the Ribbon's Developer tab to repeat the recorded actions. For this procedure to be really useful, you need some familiarity with BASIC so that you can tweak the recorded commands.

As another example of the issues involved with importing, QuickBooks applies Excel's Text format to certain cells in exported reports, such as its income statements. To do so is unnecessary, because Excel's General format recognizes and displays both text and numeric values properly. The Text format is also annoying; if you want to put a formula in a cell that's formatted as Text, you first must reformat the cell to General or to one of Excel's numeric formats. Otherwise, Excel interprets your formula as text and won't calculate it.

In other words, there are some real conveniences and advantages to using an accounting package, even for a very small business. But be aware that the subsequent use of Excel's powerful financial analysis capabilities on the accounting data often requires that you do some preliminary work with the exported figures.

## Understanding Absolute, Relative, and Mixed References

The user of a popular accounting package writes, "I click Export Report and select Export to a New Excel Spreadsheet. The export itself works fine, but then if I copy a column and paste it into my existing financial report spreadsheet, the formulas change and are incorrect."

The problem is that the accounting package being used provides formulas that refer to cells in a way that can change, depending on where the formulas are placed—and that's just what happens when the user pastes a column into an existing financial report spreadsheet. In this particular case, the accounting package was the source of the error, but there are plenty of other causes for this kind of problem—including other Excel users, people you thought were your friends.

To avoid this sort of problem, you need to be familiar with how Excel handles your data—particularly how it refers to worksheet cells. Excel has three different kinds of cell references: absolute, relative, and mixed.

Consider this formula:

```
=SUM($A$1:$B$2)
```

Entered into a cell in a worksheet, the formula returns the total of the values in cells A1, A2, B1, and B2. The range of cell addresses between the parentheses implies a rectangle of cells. The first address (here, $A$1) identifies the rectangle's upper-left corner, and the second address ($B$2) identifies its lower-right corner. The colon, called the range operator, tells Excel to include all the other cells that are in the rectangle: in this case, A2 and B1.

Suppose that you entered the formula =SUM($A$1:$B$2) in cell C3. If you then copied the formula from cell C3 and pasted it into cell Q15, or cell AA100, or cell XFD1048576, it would still refer to that same range of cells, $A$1:$B$2. It's an *absolute* reference—made absolute by the dollar signs that precede the column letters and row numbers.

In contrast, suppose you entered this formula into cell C3:

```
=SUM(A1:B2)
```

It has no dollar signs. It's a relative reference—relative to whatever cell was active when you created the reference. In this example, you enter the formula into cell C3. If you now copy and paste the formula into cell D3 (same row, one column to the right), the formula adjusts accordingly and becomes this:

```
=SUM(B1:C2)
```

Using words instead of cell addresses: Paste the copied formula one column to the right of where you originally entered it, and the relative reference responds by adjusting its columns in the same direction and distance: A becomes B, and B becomes C.

Similarly, if you copied it from cell C3 and pasted it into cell C4, it would become this:

```
=SUM(A2:B3)
```

Copy the formula down one row, and the row numbers in the relative reference adjust: 1 becomes 2, and 2 becomes 3.

Another way of thinking about this is that the original formula pointed to a rectangle of cells that starts two columns left and two rows up from the cell in which it was entered. When it's copied and pasted into a different cell, the formula still points to cells starting two columns left and two rows up. This behavior is characteristic of relative references.

A third type of reference is the *mixed* reference, in which either the column or the row—but not both—is anchored by means of the dollar sign. For example:

```
=SUM($A1:$A2)
```

If you enter this formula into cell A3, you can copy and paste it to a cell in any other column, and it will still depend on values in column A; the dollar signs anchor it to that column. But if you copy it from cell A3 into any other row, the rows in the reference will adjust accordingly. So if you copied the formula from cell A3 into cell B4, the formula in B4 would be this:

```
=SUM($A2:$A3)
```

The dollar sign before the column letter anchors the formula to that column. The dollar sign's absence before the row number allows the reference to adjust if you move it up or down. The analogous effect occurs with another sort of mixed reference:

=SUM(A$2:A$3)

which provides an anchor to rows 2 and 3 but allows the column reference to shift.

> **NOTE** The same is true with range names. By default, Excel makes absolute the cell or range of cells that a range name refers to. But you can control the reference when you establish it using Define Name, or edit it with the Name Manager, making the reference mixed or relative. See the Introduction for a brief discussion of range names.

## Getting the Journal Data to the Ledger

Whether you enter the general journal data directly into Excel or import it from another software application, the next step is usually to collect the transactions in their proper accounts within the general ledger. Figure 1.5 shows an example of entries in a general journal, and Figure 1.6 shows how you can collect these entries in the general ledger.

**Figure 1.5**
General journal entries record individual transactions in chronological order as debits and credits.

For ease in collecting the general journal entries into the general ledger, four range names are defined on the general journal sheet shown in Figure 1.5: `EntryDate` ($A$5:$A$26), `AccountNumber` ($C$5:$C$26), `JournalDebits` ($D$5:$D$26), and `JournalCredits` ($E$5:$E$26).

Two additional names are defined in the General Ledger shown in Figure 1.6: `LedgerDate`, a name defined by an absolute reference, refers to cell $A$4. `GLAccount` (short for general ledger account) refers to a cell in column D. That's ambiguous, but it's easily clarified.

**Figure 1.6**
General ledger entries accumulate individual transactions from the general journal into specific accounts.



Suppose that the General Ledger worksheet is active, and its active cell is in row 6—say, E6. If you now click the Ribbon's Formulas tab and click Define Name in the Defined Names group, you can then type `GLAccount` in the Name box. In the Refers To box, type this formula:

    =$D6

This mixed reference means that you can type this formula

    =GLAccount

into any column and any row and get a meaningful result. Because its column is fixed and its row is relative, the latter formula returns whatever value is in the row where the formula is entered, in column D.

**1**

However, entering =GLAccount in the column that it points to causes a circular reference, just as though you entered =D4 into cell D4.

The effect of this referencing on how the names work is explained in more detail later in this section.

On the General Ledger worksheet, the following array formula in its Debit column accumulates the appropriate entries from the General Journal:

```
=SUM(IF(MONTH(EntryDate)=MONTH(LedgerDate),1,0)*IF(AccountNumber =
    GLAccount,1,0)*JournalDebits)
```

This array formula accumulates the appropriate credits in column F:

```
=SUM(IF(MONTH(EntryDate)=MONTH(LedgerDate),1,0)*IF(AccountNumber =
    GLAccount,1,0)*JournalCredits)
```

**NOTE** The two General Journal formulas just shown must be entered as array formulas. After typing the formula, simultaneously hold down Ctrl+Shift and press Enter. In the formula bar, you will see a pair of curly braces around the formula. This indicates that Excel has accepted the formula as an array formula. Do not enter the braces yourself from the keyboard, or Excel will interpret the formula as text.

The formulas instruct Excel to do the following:

1. `IF(MONTH(EntryDate)=MONTH(LedgerDate),1,0)`: Evaluate each entry in the General Journal's `EntryDate` column. If the month of that date equals the date for the General Ledger, return `1`; otherwise, return `0`.

2. `IF(AccountNumber = GLAccount,1,0)`: Evaluate each entry in the General Journal's `AccountNumber` column. If the account number is the same as the account number for the current General Ledger account, return `1`; otherwise, return `0`.

3. Multiply the result of step 1 by step 2. Only when both conditions are true will this step return a `1`; otherwise, it will return `0`.

4. Multiply the result of step 3 by the General Journal's entries in the `JournalDebits` range (or its `JournalCredits` range, in the second of the previous two formulas). When both the date condition and the account condition are `true`, the result is the debit (or the credit); otherwise, the result is `0`.

5. Return the sum of step 4 as applied to all the journal entries: specifically, a debit or credit if the entry passes both the date and the account conditions, and `0` otherwise.

Be sure that you understand the following aspects of the names used in these formulas.

### No Provision for Different Workbooks

The range names assume that both the general journal and the general ledger worksheets belong to the same workbook. If the general journal belonged to a workbook named, say, `General Journal.xls`, the definitions of the names in the formulas would have to be qualified by references to that workbook. For example:

```
='C:\Financials\[General Journal.xls]JournalSheet'!JournalDebits
```

### Both Absolute and Mixed References Are Used

Consider the definitions of the names `LedgerDate` and `GLAccount`. `LedgerDate` refers to cell $A$4: Because this is an absolute reference (note the two dollar signs), `LedgerDate` returns the same value, regardless of the location of the cell where it is entered.

`GLAccount`, on the other hand, refers to the cell in column D and in the row where the formula that uses the `GLAccount` name is located. Entered in E6, then, `GLAccount` refers to D6; entered in F16, `GLAccount` refers to D16. This is a mixed reference: Only the column is fixed, and the row changes depending on where the reference to `GLAccount` is entered.

Therefore, this formula, if entered in cell F6 and shown in Figure 1.6, uses the value 1 (in cell D6) for `GLAccount`:

```
=SUM(IF(MONTH(EntryDate)=MONTH(LedgerDate),1,0)*IF(AccountNumber =
    GLAccount,1,0)*JournalCredits)
```

But if the formula is entered into cell F8, it uses the value 21 (in cell D8). Because the name `GLAccount` refers to the mixed reference $D and whatever row the name is used in, the name itself acts as a mixed reference.

> **NOTE** This is also an instance of Excel's implicit intersection. See Chapter 11, "Examining a Business Case: Investment," for a discussion of what an implicit intersection is and how it can make your life easier.

The effect of the mixed reference in this case is to anchor the reference to column D because of the dollar sign before the column letter and to allow the row to adjust because of the absence of a dollar sign before the row number.

By using these formulas, all the individual transactions from the General Journal are accumulated into the General Ledger, according to the account that they have been posted to and according to the correct date for the current General Ledger entry.

> **TIP** If you're familiar with Excel's pivot tables, you might wonder why you would not use one to summarize data from the general journal into a general ledger. You can do so if you arrange the general journal data as a three-column list or table: one column containing the name of the account, one column identifying the transaction as a debit or a credit, and the third column containing the amount. Now, if you use that list as the source data for a pivot table, with the account name as the Row field, the type of transaction (debit or credit) as the Column field, and the amount as the Data field, your pivot table will emulate a general ledger.

1

To test your grasp of this admittedly complex topic in Excel formulas, open the Excel workbook for this chapter (available via download from the publisher's website). Activate the General Journal and modify, say, one of the Cash account credits—add $100 to it, for example. Then activate the General Ledger worksheet and note what has happened to the Cash account as a result.

Another way to become familiar with the structure of these formulas is to activate one on the General Ledger, and then start the Evaluate Formula tool (in the Formula Auditing group on the Ribbon's Formulas tab). Then repeatedly press the Evaluate button to wend your way through Excel's interpretation of the formula.

## Getting the Ledger Data to the Income Statement

You can use a similar approach to accumulate the information in the general ledger into your income statement. Assume that you're working with a different general ledger than the one shown in Figure 1.6.

Suppose you have decided to number all fixed administrative expense accounts using five-digit account numbers beginning with 63. Health insurance might be account number 63310, vehicle insurance 63320, interest expense 63400, and so on. If you name the range in the general ledger that contains the account numbers as LedgerAccounts, the range containing the credits as LedgerCredits, and the range containing the debits as LedgerDebits, this array formula totals the differences between general ledger credits and general ledger debits for accounts numbered 63000 to 63999:

```
=SUM(IF(LEFT(LedgerAccounts,2)="63",LedgerCredits–LedgerDebits,0))
```

(Remember to enter the formula as an array formula. Use Ctrl+Shift and then press Enter.)

The array formula first evaluates the elements in the range named LedgerAccounts and strips off the two leftmost characters in each account number. Then, if those two characters equal 63 (as they will if the account number is between 63000 and 63999, inclusive), the formula returns the sum of the difference between the accounts' debits and credits.

You could use the formula to return the entry in your income statement that pertains to fixed administrative expenses. Similarly, if your chart of accounts assigned all account categories pertaining to fixed production expenses to five-digit numbers beginning with 64, you would use this:

```
=SUM(IF(LEFT(LedgerAccounts,2)="64",LedgerCredits–LedgerDebits,0))
```

You can accumulate most of the entries on an income statement in a similar way, working from the general journal to the general ledger to the income statement. Two types of entries in particular—entries such as accounts payable and prepaid expenses that involve accrual, and assets that are subject to depreciation—usually require special attention. Both affect the timing of your company's earnings. Accrual accounting is discussed in the next section.

> **TIP** The procedures suggested in this chapter work most easily if you maintain your general journal, general ledger, and income statement in the same workbook. However, Excel does not permit you to use the same name more than once in the same workbook unless you qualify it with a sheet name. So, you cannot create two instances of a range named Debits, for example—once as a name that refers to the general journal and once as a name that refers to the general ledger—in the same workbook. One option is to use names such as GeneralJournal!Debits, where GeneralJournal is the name of a worksheet. (This is the attribute that you set when you define a name's scope in Excel 2007 or a later version.) Another option, used in the previous examples, is to use the name Journal-Debits to distinguish that range from LedgerDebits.

→ Depreciation is covered in the discussion of fixed assets in Chapter 16, "Fixed Assets."

It's worth mentioning again that true double-entry accounting applications take care of all this data management for you. Following are the reasons to handle it yourself in Excel:

■ Having a business that requires relatively few transactions per accounting period

■ Exercising the greatest amount of flexibility possible over the way the business's books are managed

■ Getting a fundamental understanding of the actions that an accounting package takes but that it doesn't demonstrate for the user

## Managing the Financial Analyses with Accrual Accounting

Accrual accounting involves two steps: identifying the revenues for a given period and matching the associated costs, such as the cost of goods sold and sales commissions, to those revenues. This is called the matching principle and is a basic concept used throughout the accounting process.

The notion of matching revenue to costs incurred to produce the revenue might seem obvious, but it has some subtle implications. Suppose that you purchase license plates for a company vehicle. You pay $400 for the plates in January. You write off the full $400 in January. (That is, you show it as a cost that you incurred fully during that month.) You produce revenue or otherwise conduct business by using your vehicle during January and for the next 11 months.

In this case, you have overstated your cost of doing business in January, understated it from February through December, and failed to match the subsequent revenues with the initial expenditure. Accrual accounting allows you to spread the cost of the plates over (in this case) the full 12 months and to match the revenues the vehicle helps produce to the cost outlay for the license plates.

Revenue is not the same as cash received, and expense is not the same as cash spent. You normally recognize revenue when the effort required to generate the sale is substantially complete and there is reasonable certainty that you will receive payment. The accountant views the timing of the actual cash receipts, or the actual cash outlay, as only a technicality.

> **NOTE**  Small businesses often use another approach, termed the *cash method*, instead of the accrual method. Under the cash method, the business records revenue when the cash is received and records costs or expenses when the cash is spent. Although the cash method is a less accurate means of associating revenues with costs and expenses, small businesses sometimes forego the extra accuracy of the accrual method for the extra simplicity of the cash method. Most single-purpose accounting software allows you to specify whether you want it to treat transactions according to the accrual method or the cash method.

For credit sales, the accrual principle means that you recognize the revenue at the time of the sale, not necessarily when the customer makes payment. Suppose that you use your credit card to buy a new set of golf clubs at your local sporting goods store. The store recognizes the revenue when you sign the credit slip, but it does not receive cash until your credit card company sends it payment. The time between recognition of revenue and cash payment can be significant. The fact that a company is profitable is not a guarantee that its cash flow will be sufficient to keep it solvent.

If a company's management is to properly understand the relationship between the company's revenues and its costs over a given period, it needs to see income statements. Balance sheets are necessary for management to understand the relationship between the company's assets and its liabilities—its worth—at a given point in time.

You will find additional coverage on balance sheets in the following chapters:

- Chapter 2, "Balance Sheet: Current Assets"
- Chapter 3, "Valuing Inventories for the Balance Sheet"
- Chapter 4, "Summarizing Transactions: From the Journals to the Balance Sheet"

Cash flow statements enable management to assess the company's solvency. In other words, these statements show whether sufficient working capital exists and will exist to continue business operations.

→ Cash flow statements are covered in detail in Chapter 5, "Working Capital and Cash Flow Analysis."

These three types of statements—income statements, balance sheets, and cash flow statements—are intimately related, even though they serve different purposes and provide different perspectives on a company's overall financial position. These relationships are determined largely by the principle of matching costs to revenues in the income statement via accrual.

For example, increases in revenues cause increases in the owner's equity on the credit side of the balance sheet, and increases in accrued expenses cause decreases in owner's equity on the debit side of the balance sheet.

Actual cash receipts and outlays, shown on cash flow statements, summarize the effects of increases and decreases in revenues and expenses on the amount of the company's working capital.

Cash flows might or might not reflect the accrual of revenues and expenses. For example, something you buy in March might help you produce revenue for the rest of the calendar year, but the entire purchase is recorded in March. This highlights the need for adjusting entries, which help distribute the initial outlay across several accounting periods. When your company acquires an asset such as an insurance policy, you might or might not use up that asset to create revenue during the particular accounting period when you bought it.

## CASE STUDY: ADJUSTING ENTRIES

Martin Consulting is a small business that provides assistance to its customers in assessing the quality of ground water. Figure 1.7 shows several examples of how Martin Consulting uses adjusting entries to record transactions via accrual.

Martin begins by getting a trial balance. This process involves totaling the balances of accounts with debit balances and then doing the same for accounts with credit balances. When the two totals agree, the ledger is in balance. See columns B and C in Figure 1.7.

**Figure 1.7**
Adjusting entries help to accrue revenues and expenses in the proper period.

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| | | Trial Balance | | Adjustments | | Adjusted Trial Balance | |
| 1 | Martin Consulting worksheet, 7/31/2018 | Debit | Credit | Debit | Credit | Debit | Credit |
| 2 | | | | | | | |
| 3 | Cash | $32,650 | | | | $ 32,650 | $ - |
| 4 | Accounts Receivable | $ 3,472 | | | | $ 3,472 | $ - |
| 5 | Unexpired Insurance | $ 684 | | | $ 57 | $ 627 | $ - |
| 6 | Supplies | $ 592 | | | $ 136 | $ 456 | $ - |
| 7 | Office Equipment | $ 3,470 | | | | $ 3,470 | $ - |
| 8 | Office Equipment: Accumulated Depreciation | | $ 1,157 | | $ 96 | $ - | $ 1,253 |
| 9 | Accounts Payable | | $ 4,223 | | | $ - | $ 4,223 |
| 10 | Unearned Consulting Fees | | $ 1,280 | $ 160 | | $ - | $ 1,120 |
| 11 | Salaries Payable | | | | $ 465 | $ - | $ 465 |
| 12 | Chris Martin, Capital | | $31,884 | | | $ - | $ 31,884 |
| 13 | Analysis Fees | | $ 6,250 | | | $ - | $ 6,250 |
| 14 | Advertising | $ 145 | | | | $ 145 | $ - |
| 15 | Salaries | $ 3,600 | | $ 465 | | $ 4,065 | $ - |
| 16 | Communications | $ 181 | | | | $ 181 | $ - |
| 17 | Insurance expense | | | $ 57 | | $ 57 | $ - |
| 18 | Supplies consumed | | | $ 136 | | $ 136 | $ - |
| 19 | Consulting Fees Earned | | | | $ 160 | $ - | $ 160 |
| 20 | Depreciation Expense: Office Equipment | | | $ 96 | | $ 96 | $ - |
| 21 | | | | | | | |
| 22 | Total | $44,794 | $44,794 | $ 914 | $ 914 | $ 45,355 | $ 45,355 |
| 23 | | | | | | | |

Martin Trial Balance    Martin Finar ...

Ready      100%

**1**

At the end of July, Martin Consulting prepared the worksheet shown in Figure 1.7 as the basis for its income statement and balance sheet. The rest of this section details the steps that Martin takes to move from the basic worksheet to the financial reports for the month.

On July 1, an errors-and-omissions insurance policy was purchased in full to provide protection against faulty advice that might be given to the company's clients. The policy will remain in effect for 12 months. The cost of this policy is debited to an asset account in row 5, column B of the worksheet. When the worksheet is prepared at the end of the month, 1/12 of the value of the policy has expired; that value now becomes an expense incurred during the month of July. Row 5, column E contains $57 as an adjusting credit entry, reflecting that 1/12 of the policy's asset value has expired. Row 5, column F shows the remaining value of the asset, or $627. The adjusting debit entry appears in row 17, column D.

Notice how the cost of the insurance policy is handled. The full policy premium, $684, was paid during July from the company's checking account. The checking account's balance at the end of July is therefore $684 less than it would have been otherwise. Balancing that cost is the presence of a new asset: a 12-month insurance policy valued at $684 as of 7/1/2018.

By the end of July, 1/12 of the policy's value has expired. That decrease in the value of the asset is recorded in two places:

■ As an adjustment to the value of the asset in row 5 of the worksheet. The adjusted value is copied to the balance sheet, where it appears as part of the company's current value.

■ As an expense recorded in row 17. This expense is recorded for the month of July, even though the actual cash outlay for the insurance in July was $684. This is the mechanism that is used to match the timing of the expense with the timing of the revenue it helped to produce.

During the same period, Martin Consulting uses $136 worth of office supplies to help produce its revenue. Another adjusting entry of $136 appears in row 6, column E, reflecting the decrease in the value of the original office supplies asset of $592, and applied against that amount in row 6, column F to show its remaining value of $456 at the end of the month. The adjusting debit entry appears in row 18, column D.

The rationale for these adjusting entries is pretty clear. On July 1, the company owned 12 months of insurance coverage, and it owned 11 months' worth of coverage on July 31. Similarly, it owned $592 in office supplies on July 1 and $456 on July 31. These amounts are directly measurable, and Martin Consulting can easily enter, as adjusting debits and credits, the portions that expire or are used as expenses during the month of July.

But office equipment is another matter. At the beginning of July, the company owned equipment originally valued at $3,470 (see row 7, column B). How much of that $3,470 was used up in the production of the month's revenues? The equipment is still there: The computer is still creating worksheets, the photocopier is still making copies, the telephone is still ringing. Yet some value was taken from the equipment to generate revenue.

Depreciation is the means used to account for the fact that the equipment provided value to the process of revenue generation. In contrast to ticking off another month that has expired on an insurance policy or counting the number of mailing envelopes that were addressed and sent, Martin must estimate the value of the office equipment "used" during the month of July. He does so by means of depreciation.

## Using Straight-Line Depreciation

Martin can use one of several methods to calculate the depreciation for a month (or for a quarter or for a year).

➜ Depreciation methods, and the way Excel handles them, are covered in detail in Chapter 16, "Fixed Assets."

Suppose that Martin uses the straight-line method of depreciation. The assumption is that the office equipment has a useful life of three years and will have no value after that. Then, for each month that passes during the three-year equipment lifetime, the value of the equipment declines by 1/36 of its original value—that is, the equipment depreciates each month by 1/36, or $96. The adjusting credit entry is in row 8, column E, and the adjusting debit entry is shown in row 20, column D.

By estimating the amount of monthly depreciation, Martin can calculate an office equipment expense for the month. This makes it possible to associate the expense with the revenue and to obtain a clearer picture of the month's income. Again, the matching principal holds that revenues should be matched with the expenses that helped to produce them.

You use adjusting entries not only with expenses, but also with revenues. Suppose that toward the end of July, Martin signed an agreement and accepted cash payment to perform eight hours of consulting at $160 per hour. The full amount of $1,280 is credited to an asset account called Unearned Consulting Fees. Before the end of the month, Martin performed one of the eight contracted hours. Actually doing that work converts some of the unearned fees to an earned status. Adjusting entries, in row 10, column D, and row 19, column E, show that $160 of the unearned fee has been converted to earned status during July.

The four adjusting entries for supplies and depreciation previously described have to do with activities that both begin and end during an accounting period. For example, the use of an estimated $136 in office supplies took place between July 1 and July 31. An adjusting entry can also record an activity that spans accounting periods. Suppose that Martin prepared an assistant's salary check, in payment for the previous two weeks, one week before the end of the month. The assistant then accrued one week of salary from July 25 through July 31. To show that this accrued salary is an expense attributable to July instead of August, Martin makes an adjusting entry in row 15, column D. To show that it is a liability that will be met subsequently (probably in August), it is also entered as a liability credit in row 11, column E.

**1**

## Preparing the Trial Balance

Excel makes it simple to accumulate the trial balance and the adjusting entries into an adjusted trial balance. The actual formulas used in columns F and G of Figure 1.7 (the adjusted debit and credit balances) are discussed in detail in the "Getting an Adjusted Trial Balance" section in Chapter 5, "Working Capital and Cash Flow Analysis." For now, be aware of the following:

■ Each adjusted debit entry is based on this formula. The actual formulas in column F of Figure 1.7 evaluate the formulas' results to suppress negative amounts:

```
DebitBalance=(TrialDebits-TrialCredits)+(AdjustDebits-AdjustCredits)
```

■ Each adjusted credit entry is based on this formula, also evaluated to suppress negative amounts:

```
CreditBalance=(TrialCredits-TrialDebits)+(AdjustCredits-AdjustDebits)
```

The totals of the adjusting entries appear in Figure 1.7, in row 22, columns D and E. The totals of the adjusted entries appear in Figure 1.7, in row 22, columns F and G. The equality of the debit and credit totals shows that the entries are in balance.

> **TIP**
>
> Excel provides several underline formats, including Single Accounting and Double Accounting. These are often used for, respectively, subtotals and totals. To access these formats, click the Ribbon's Home tab and then select Format in the Cells group. Select Format Cells from the menu, click the Font tab, and then select the Underline combo box. In versions of Excel prior to 2007, use Format, Cells, and select the Font tab. Then use the Underline combo box to select the type of underline you want.

## Moving Information into an Income Statement

Finally, it's time to move the adjusted trial balances to an income statement and a balance sheet (see Figure 1.8).

Rows 3 through 12 represent asset and liability accounts. They are copied from the adjusted trial balance to the balance sheet columns. Rows 13 through 20 represent revenue and expense accounts and are copied to the Income Statement columns. Then, row 21 of columns H and I totals the debits and credits of the revenue and expense accounts. Notice that they are no longer in balance, nor should they be. The company's revenues for July exceeded its expenses, and the difference is its operating income. To arrive at this figure, subtract the total expenses of $4,680 in cell H21 from the total revenues in cell I21. The result, $1,730, appears in cell H22 and is the operating income for the month of July. Adding that to the total expenses of $4,680 results in $6,410, which is in balance with the total revenues for the month.

**Figure 1.8**
Entries are copied from
the adjusted trial balance
columns to `Income`
`Statement` and
`Balance Sheet`
columns.



| | A | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|
| 1 | Martin Consulting worksheet, 7/31/2018 | Income Statement | | Balance Sheet | | | |
| 2 | | Debit | Credit | Debit | Credit | | |
| 3 | Cash | | | $32,650 | $ - | | |
| 4 | Accounts Receivable | | | $ 3,472 | $ - | | |
| 5 | Unexpired Insurance | | | $ 627 | $ - | | |
| 6 | Supplies | | | $ 456 | $ - | | |
| 7 | Office Equipment | | | $ 3,470 | $ - | | |
| 8 | Office Equipment: Accumulated Depreciation | | | $ - | $ 1,253 | | |
| 9 | Accounts Payable | | | $ - | $ 4,223 | | |
| 10 | Unearned Consulting Fees | | | $ - | $ 1,120 | | |
| 11 | Salaries Payable | | | $ - | $ 465 | | |
| 12 | Chris Martin, Capital | | | $ - | $31,884 | | |
| 13 | Analysis Fees | $ - | $ 6,250 | | | | |
| 14 | Advertising | $ 145 | $ - | | | | |
| 15 | Salaries | $ 4,065 | $ - | | | | |
| 16 | Communications | $ 181 | $ - | | | | |
| 17 | Insurance expense | $ 57 | $ - | | | | |
| 18 | Supplies consumed | $ 136 | $ - | | | | |
| 19 | Consulting Fees Earned | $ - | $ 160 | | | | |
| 20 | Depreciation Expense: Office Equipment | $ 96 | $ - | | | | |
| 21 | | $ 4,680 | $ 6,410 | $40,675 | $38,945 | | |
| 22 | Operating Income | $ 1,730 | | | $ 1,730 | | |
| 23 | | $ 6,410 | $ 6,410 | $40,675 | $40,675 | | |

Martin Financials

Ready | 100%

You use a similar process to obtain the information for the balance sheet. Notice that this
final step, copying information from the adjusted trial balance to the income statement and
balance sheet, is merely a matter of separating the revenue and expense data from the asset
and liability data. Revenues and expenses go to the income statement; assets and liabilities
go to the balance sheet.

# Organizing with Traditional Versus Contribution Approaches

The traditional approach to organizing income statements focuses on the functions that a
business performs, such as production, administration, and sales. This functional method
of classifying costs does not allow for the examination of cost behavior. Traditional income
statements are not set up to describe the cost drivers of the business.

There are no subcategories to analyze, or to use to manage costs, within each classification.
Costs are grouped without indicating whether they are fixed, variable, or some other
classification. When an income statement classifies results by means of administrative
structures, it is difficult to analyze the statement, to use it to make decisions, and to offer
recommendations. The statement might be just fine for the purposes of financial account-
ing, but virtually useless for the purposes of management accounting.

In contrast, the contribution format classifies results by the sources and uses of the company's
resources and therefore helps to answer many additional questions. For example:

- What are the variable selling expenses for a given product?
- How much of our total costs are fixed costs?
- New equipment will increase our fixed costs because it must be depreciated. Will the
equipment reduce our variable costs enough to result in lower total costs?

A manager needs more specific information than is available in the traditional income statement to answer questions such as these.

This is not at all to say that there is no place for the traditional format. Almost certainly, you would use a traditional format if you were applying for a business loan or preparing for an initial public stock offering. The traditional format is fine for those purposes, and it's widely recognized. And if you were considering the sale of your business, you might well show income statements in both formats to prospective buyers.

The contribution format is not designed for public consumption. It is intended mainly for internal purposes and is used by management for day-to-day, operational decisions. Consider the example shown in Figure 1.9.

**Figure 1.9**
The contribution format of an income statement focuses on data helpful for operational decisions.



In Figure 1.9, variable expenses are deducted from sales to derive what is known as a contribution margin.

→ **See** Chapter 21, "Pricing and Costing," for more information on contribution margins.

Note that a contribution margin is the result of subtracting variable expenses from revenues. You can use the contribution margin to meet fixed expenses and to contribute toward company profit.

You need this sort of analysis if you are to make informed business decisions about products. For example, Figure 1.9 shows that Discount Computer's largest cost category is Variable Production expenses. A variable expense is one that changes depending on the number of units sold. The more computer products this firm sells, the larger is its variable production expense.

The contribution format used by the income statement in Figure 1.9 directs a manager's attention to the costs involved in producing products. Without this data, the manager who wants to cut costs might focus on reducing fixed production costs when it's the variable costs that need attention.

The contribution approach is useful in making decisions about product profitability, product pricing, marketing channels, and many situational decisions. It enables you to understand the contribution that each product brings to the bottom line and how much to variable costs. It helps you to better understand the cost drivers of your business.

A company's business decisions focus on cost reduction, productivity, and profitability by product line. To sharpen that focus, it is necessary to understand the structure of the costs that reduce your profitability. You will see more on this matter in future chapters.

# About Power BI

Power BI is an offering from Microsoft that is intended to support the design and dissemination of reports—frequently, dashboards that consist of analytics, although standard reports such as the income statements discussed in this chapter also are supported.

At the time when I am writing this chapter, in early 2018, Power BI has been in public release for roughly three years. It's still undergoing revision and enhancement, component names are still being changed, introductory webinars are being held, pricing and availability are in flux—in short, Power BI is not as yet a mature product.

Nevertheless, I've chosen to discuss Power BI in this book because it's a business application that's tightly coupled to Excel, and the book's title is *Business Analysis with Excel*. Later chapters show how to create charts and other numeric summaries in Power BI, using data that originates in Excel. This brief overview of Power BI is meant to convey a bit about what you can expect.

"BI" stands for *business intelligence* and is something of a misnomer. Certainly, most Power BI capabilities address business topics. Sources of data that you can use in conjunction with Power BI are business oriented. The current list of sources includes, apart from Excel, Oracle databases, Sybase databases, XML files, SAP, Hadoop, Azure, Salesforce and many others. Nevertheless, there's no reason at all that Power BI couldn't be used to synthesize and distribute meta-analyses, medical and pharmacological summaries, sports data such as current betting lines, and so on. But the product's thrust is clearly to analyze and distribute business data.

Power BI embraces about seven (depending on how you count) components. The three that are most directly associated with the Power BI product are Power BI Desktop, Power BI Service, and Power BI Mobile Apps.

# Power BI Desktop

This component is at present free of charge for both acquisition and use. There are many sites from which you can download it. Because the entire Power BI offering is changing so much and so rapidly, your best bet is probably to use your browser to search for "Download Power BI Desktop" or words to that effect. It's likely that you'll wind up with a Microsoft site from which you can download this component.

You'll download an installer. Run it and you're good to go.

Several chapters in this book provide step-by-step instructions on how to get data in Excel workbooks into a Power BI Desktop report. The present section is intended only as an overview.

You can use Power BI Desktop's user interface to pull fields (also termed *variables*) into a report canvas. The canvas can take the form of a chart or a table. Many different chart types are available, and if you're an experienced Excel user you've encountered them. For example:

- Bar charts
- Column charts
- Line charts
- Area charts
- Scatter charts
- Pie charts

You begin by clicking one of the chart types in the Desktop interface. Desktop responds by putting an empty instance of that type—a sort of template—on the canvas. Then drag one or more fields from the data source into the template. There's also a location on the Desktop interface that's termed the *bucket* or the *well*. Fields placed there are easier to re-order and otherwise manage than to do so in the report template.

You can also pull data from a source that Power BI Desktop recognizes into a table on the report canvas. Just start by clicking the Table instead of a chart type.

There are so many ways that Power BI Desktop resembles Excel—at least in a conceptual sense—that you can wind up expecting it to behave like Excel does. But there are at least a few ways in which they differ, unexpectedly.

For example, suppose that you copy and paste data that occupies several rows and one column into an Excel worksheet. You don't expect Excel to automatically sort the data. To the contrary, in Excel the data is very likely already in the order you want it, and even if it needs sorting, you're just a couple of clicks away from getting it sorted.

But that's not how Power BI Desktop works. Suppose that you use it to import a column with the ordered values January, February, March, … , December. Power BI Desktop takes over, and you wind up with the month names in alphabetical order: April, August, December, … , September.

Maybe that's what you wanted, but I bet it's not. As you'll see in a couple of later chapters, you need to supply a field that specifies the order in which the rows should appear, and tell Power BI Desktop to use that field as a sort key. In some cases you can keep the sort key off the report, but you'll have to include it in other cases.

You'll find a way to deal with this kind of difficulty, as it applies to the income statements discussed in Chapter 20. There, the sorting difficulty is sharpened by the presence of many empty cells, caused by the layout used by most income statements. I'm deferring the discussion to Chapter 20 because that chapter focuses on the import of QuickBooks profit and loss statements into Excel.

Or suppose that you want to import two columns of numeric data into Power BI Desktop, and show it there in the form of a scatter chart rather than a table. You click the Scatter Chart visual in Power BI Desktop to put an empty scatter chart on the canvas. Then you drag the first column of values into the bucket reserved for X values, and the second column of values into the bucket reserved for Y values.

*One* data marker shows up in the template—not several. Power BI Desktop makes the assumption, not made by Excel, that you want data points totaled before they're displayed on the scatter chart. (To correct the problem, click the arrowhead next to each field's name in the Visualizations pane, and click Do Not Summarize.)

## Power BI Service and Mobile Apps

Once you have created a report on Power BI Desktop, you can pass it along to Power BI Service for further enhancement. For example, in Power BI Service, you can combine several reports from Power BI Desktop into a single dashboard (that capability does not exist in Power BI Desktop). Power BI Service offers other functionality, such as combining your company's income statement with that of a publicly held corporation to create a comparative, common-sized income statement.

Mobile Apps enables you to publish reports created in Power BI Desktop (or created and enhanced in Power BI Service) to various display devices such as smartphones, laptops and tablet PCs.

Power BI Desktop is free—as I write this there is no charge to download, install or run it. Its usefulness is of course restricted without the ability to publish reports via Power BI Service and Mobile Apps. I decided to provide some coverage of Power BI Desktop in several chapters of this book because it's a convenient, no-cost way to familiarize yourself with a major component of the overall Power BI offering. I decided not to discuss Power BI Service and Mobile Apps in part because you would have to spend money to make use of the material (whereas you almost certainly have ready access to Excel), and in part because the choice to use Power BI Service and Mobile Apps is generally a corporate decision rather than a personal one.

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# Summary

In this chapter, you looked into various formats and purposes for income statements. They can be structured differently, depending on their audience and which management functions they support.

You saw how to use absolute, relative, and mixed references in Excel to return results that are independent of, fully dependent on, or partly dependent on their placement on the worksheet. Also, you learned about the use of range names and array formulas in Excel.

You learned ways to use Excel to maintain a general journal of transactions, and you learned how to roll those transactions into a general ledger and an income statement. In practice, you may leave these tasks to your accounting application. But by looking at the process in the context of an Excel worksheet, you'll have a much stronger grasp of what your application is doing behind the scenes. And you're much less likely to short-circuit the process by processing a transaction incorrectly.

You also read about accrual accounting and the matching principle, under which costs are associated with the revenues that they help to produce.

The income statement is fundamental to understanding the way your business operates. It has various uses and a virtually unlimited number of possible formats. You may end up using two formats: one more detailed and useful for planning and the other for reporting requirements. The statement structure and formats that you choose depend on both your audience and your purpose for a particular income statement.

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